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10/824,291	04/14/2004	Jeffrey D. Muhs	0735.3	6054
24298	7590	04/18/2007		
UT-Battelle, LLC Office of Intellectual Property One Bethal Valley Road 4500N, MS-6258 Oak Ridge, TN 37831			EXAMINER SMITH, JACKSON R	
			ART UNIT 1709	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		04/18/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/824,291

Applicant(s)

MUHS ET AL.

Examiner

Jack Smith

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 4/14/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

**DETAILED ACTION*****Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the specific initiations of claims 2 and 7 (i.e., "a fiber distribution panel"), must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

**Double Patenting**

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 5-8 and 10-12 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 2 of copending Application No. 10/633027 in view of Muhs (J. D. Muhs, "Design and Analysis of Hybrid Solar Lighting and Full-Spectrum Solar Energy Systems", Solar 2000, July 16-21, 2000, American Solar Energy Society) for all claims and in further view of Nagao et al. (US Patent 3,626,040) for claim 8 and in further view of Kessler et al. (US Patent 6,416,181 B1) for claims 10 and 12.

This is a provisional obviousness-type double patenting rejection as 10/633027 has not yet issued.

The limitations of instant claim 5-7 and 11 are fully encompassed by the limitations of claims 1 and 2 in Application No. 10/633027 except for the limitations that the filter filters the full spectrum solar radiation into visible light (instant claim 5) and the inclusion of a fiber distribution panel (instant claim 7). Note that the "quartz rod removably disposed in said receiver housing" of claim 1 in Application No. 10/633027 is both functionally and structurally identical to the "mixing rod movably displaced in said receiver housing" in the instant application. Indeed, the specification of the instant application gives quartz as the "preferred" material for said "mixing rod" in paragraph 0023.

Muhs discloses a Secondary Optical Element for a hybrid solar energy distribution system (hybrid lighting system, Figure 3, and described in the first paragraph in left column of page 3). Said Secondary Optical Element can also be considered to be a filter in the sense that it filters the solar radiation into visible light (and separates it from near IR light) before it reflects it onto the fiber receivers (concentric fiber mount assembly, 3, along with the large core optical fibers, 4) as described in the bottom paragraph of the left column of page 4. As Muhs explains in the top paragraph of the right column of page 4, separating IR from visible light is useful because it allows the "two energy streams" (i.e., the visible and IR portions of the light) generated to be used "for different purposes" and gives the examples of "lighting and electricity generation."

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Muhs shows a fiber distribution panel in Figure 6b as part of the hybrid solar energy distribution system whose purpose is to arrange the eight fibers so that their centers are evenly distributed on a circle (caption, Figure 7) which allows for "improved fiber placement (bundled and pivoted about a radial axis)" (item 3, left column, page 5).

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the secondary mirror of the device of Application No. 10/633027 with the Secondary Optical Element of Muhs as a filter to separate IR from visible light and use the resulting two energy streams for different purposes such as lighting and electricity generation. It would also have been obvious to one of ordinary skill in the art at the time of the invention to include the fiber distribution panel of Muhs in the device of Application No. 10/633027 in order to improve fiber placement such that the fibers are bundled and pivoted about a radial axis.

As to claim 11, Muhs explains that the Secondary Optical Element is "made of up of eight flat sections" in the top paragraph of the right column of page 5.

As to claim 8, the combination of instant claims 1 and 2 with Muhs above discloses all of the features of claim 5 and further teaches that the collector contains a bundle of fibers (approximately eight 18-mm large-core optical fibers, 4, Figure 6a). What this combination fails to disclose is that the fiber bundle comprises a thermally compressed fiber bundle.

Nagao et al. teach a method for making fused bundles of light-conducting fibers in which the fibers are placed within a mold, "heated to fusing temperature and compressed" with the aid of an applied pressure. As explained in column 1, lines 24-26, the fiber bundles resulting from this process have the advantage of being virtually free of "non-uniform distortions" and, therefore, improved optical performance. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the fiber bundles of the combination of instant claims 1 and 2 with Muhs above with the thermally compressed fiber bundles of Nagao et al. in order to improve the optical performance of the latter by virtually eliminating non-uniform distortions in the fiber bundle.

As to claims 10 and 12, the combination of instant claims 1 and 2 with Muhs above discloses all of the features of claim 5. What the modified device of Muhs fails to provide is the primary mirror is segmented into multiple sections.

Kessler et al. disclose a large curved mirror (24) similar in shape and reflective function to the primary mirror of both Application No. 10/633027 (primary mirror, 30) and that of Muhs (primary mirror, 1, Figure 6a) as part of a monocentric autostereoscopic optical apparatus (Figure 1). As Kessler et al. explain in column 12 lines 9-13, it is less expensive and more practical to assemble such a curved mirror from "two or more smaller mirror segments." It would have been obvious to one of ordinary skill in the art at the time of the invention to provide segmented mirror of Kessler et al. as the primary mirror in the collector of Muhs in order to provide for a less expensive and more practical assembly of said mirror.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3, 5-7, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muhs (J. D. Muhs, "Design and Analysis of Hybrid Solar Lighting and Full-Spectrum Solar Energy Systems", Solar 2000, July 16-21, 2000, American Solar Energy Society) in view of Levinson (US Patent 5,271,079).

As to claim 1, Muhs discloses a hybrid solar energy distribution system (hybrid lighting system, Figure 3, and described in the first paragraph in left column of page 3) with a preferred design for its collector (preferred design for the hybrid solar collector, Figure 6a). The system comprises: a receiver for receiving visible light (concentric fiber mount assembly, 3, along with the large core optical fibers, 4) that contains at least one fiber; a receiver housing (the housing surrounds the fibers and is shown in both Figures 6a and 6b), a fiber at least partially disposed in said housing (as detailed in Figure 6b), said fiber further transmitting visible light to a light distribution system ("light distribution system," 3, first paragraph in left column of page 3); at least one hybrid luminaire ("hybrid



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luminaires," 5, in left column of page 3), and a means for controlling at least one of said hybrid luminaire and said light distribution system ("hybrid lighting control systems," 4, in left column of page 3). What Muhs fails to disclose is a mixing rod removably disposed in said receiver housing.

Levinson discloses a light mixing device that uses a mixing rod (14) to take supplied from a plurality of light generating devices and direct it evenly to a plurality of optical fibers (56) (Figures 1 and 2). Levinson teaches the use of said mixing rod to "collect more of the light emitted from a light source and supply that light to a plurality of optical fibers" (Column 2, lines 29-31). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the mixing rod of Levinson to the receiver of Muhs in order to collect more of the light emitted from the light source (i.e., the sun) and supply that light to the plurality of optical fibers (large core optical fibers, 4).

As to claim 2, Muhs shows a fiber distribution panel in Figure 6b as part of the hybrid solar energy distribution system.

As to claim 3, Muhs teaches that the hybrid luminaries may incorporate "light originating from two or more sources, at least one being natural and another being electric" in the bottom paragraph of the right column of page 3. Muhs specifies sunlight as a natural lighting source for the hybrid luminaries in the second paragraph from the bottom in the left column of page 3 with the sentence: "Hybrid lighting systems will depend on electric lamps when sunlight is incapable of supplying sufficient levels of illumination such as on cloudy, overcast days and at night." Muhs further specifies that the electric source may be

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“conventional fluorescent lamps located in luminaries” in the bottom paragraph of the left column of page 3.

As to claim 5, Muhs discloses a hybrid collector(preferred design for the hybrid solar collector, Figure 6a). The system comprises: a primary mirror for producing reflected full spectrum solar radiation (primary mirror, 1, Figure 6a), as well as a Secondary Optical Element (Secondary Optical Element, 2) whose purpose is to “focus visible, nondiffuse solar energy onto a series of centrally located, large-core optical fibers, while at the same time focusing the rejected infrared (IR) solar radiation onto a concentrating PV cell located at the back of the secondary optical element” (bottom paragraph of left column, page 4). This Secondary Optical Element reflects visible light and, therefore, is a secondary mirror. In fact, it is referred to as a “spectrally selective cold mirror” by Muhs in the top paragraph of the left column of page 4. Said Secondary Optical Element can also be considered to be a filter in the sense that it filters the solar radiation into visible light before it reflects it onto the fiber receivers (concentric fiber mount assembly, 3, along with the large core optical fibers, 4), as recited above and originally described in the bottom paragraph of the left column on page 4. Muhs further discloses a receiver for receiving visible light that contains at least one fiber; a receiver housing (the housing surrounds the fibers and is shown in both Figures 6a and 6b), a fiber at least partially disposed in said housing (as detailed in Figure 6b). What Muhs fails to disclose is a mixing rod removably disposed in said receiver housing.

Levinson discloses a light mixing device that uses a mixing rod (14) to take supplied from a plurality of light generating devices and direct it evenly to a plurality of optical fibers (56) (Figures 1 and 2). Levinson teaches that the use of said mixing rod is effective to "collect more of the light emitted from a light source and supply that light to a plurality of optical fibers" (Column 2, lines 29-31). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the mixing rod of Levinson to the receiver of Muhs in order to collect more of the light emitted from the light source (i.e., the sun) and supply that light to the plurality of optical fibers (large core optical fibers, 4).

As to claim 6, the secondary mount supporting the secondary mirror (in the Secondary Optical Element) of Muhs is shown in Figure 6a. Said structure is non-rigid in the sense that it allows the tilting of the eight flat sections of the secondary mirror by 2° (top paragraph, right column, page 5). Although Muhs quotes a blocking fraction of 5 % (top paragraph, right column, page 5), he also states that this fraction can be reduced upon routine optimization by one skilled in the art. In the same paragraph he states that such "optimization routines will likely reduce the blocking fraction to less than 3.0 % in future designs."

As to claim 7, Muhs shows a fiber distribution panel in Figure 6b as part of the hybrid collector.

As to claim 9, Muhs shows the positioning of multiple collectors in a mirror farm array in Figure 5 and refers to the sun tracking system in Figure 6a (conventional rotational tracking mechanism, 6). Muhs mentions explicitly that these are solar collectors (caption, Figure 5). Therefore, the purpose of their

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tracking mechanisms is to track a single object (i.e., the sun). It would have been obvious to one of ordinary skill in the art to connect them to a single tracking system that tracks the position of the sun.

As to claim 11, Mohs describes an initial embodiment of the secondary mirror, which is part of said Secondary Optical Element, in the top paragraph of the right column of page 5 that "made of up of eight flat sections."

6. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muhs (J. D. Muhs, "Design and Analysis of Hybrid Solar Lighting and Full-Spectrum Solar Energy Systems", Solar 2000, July 16-21, 2000, American Solar Energy Society), Levinson (US Patent 5,271,079) as applied to claims 1 and 5 above and in further view of Nagao et al. (US Patent 3,626,040).

The combination of Muhs and Levinson teaches all the limitations of claims 1 and 5 above and further teaches that the system contains a bundle of fibers (approximately eight 18-mm large-core optical fibers, 4, Figure 6a), but does not teach that the fiber bundle comprises a thermally compressed fiber bundle.

Nagao et al. teach a method for making fused bundles of light-conducting fibers in which the fibers are placed within a mold, "heated to fusing temperature and compressed" with the aid of an applied pressure. As explained in column 1, lines 24-26, the fiber bundles resulting from this process have the advantage of being virtually free of "non-uniform distortions" and, therefore, improved optical performance. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the fiber bundles of the modified device of Muhs

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with the thermally compressed fiber bundles of Nagao et al. in order to improve the optical performance of the latter by virtually eliminating non-uniform distortions in the fiber bundle.

7. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muhs (J. D. Muhs, "Design and Analysis of Hybrid Solar Lighting and Full-Spectrum Solar Energy Systems", Solar 2000, July 16-21, 2000, American Solar Energy Society) in view of Levinson (US Patent 5,271,079) as applied to claim 5 and in further view of Kessler et al. (US Patent 6,416,181).

The combination of Muhs and Levinson above discloses all of the features of claim 5 and describes an initial embodiment of the secondary mirror, which is part of said Secondary Optical Element, in the top paragraph of the right column of page 5 that "made of up of eight flat sections". What the modified device of Muhs fails to provide is the primary mirror is segmented into multiple sections.

Kessler et al. disclose a large curved mirror (24) similar in shape and reflective function to the primary mirror of Muhs as part of a monocentric autostereoscopic optical apparatus (Figure 1). As Kessler et al. explain in column 12 lines 9-13, it is less expensive and more practical to assemble such a curved mirror from "two or more smaller mirror segments." It would have been obvious to one of ordinary skill in the art at the time of the invention to provide segmented mirror of Kessler et al. as the primary mirror in the collector of the modified device of Muhs in order to provide for a less expensive and more practical assembly of said mirror.

### ***Conclusion***

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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack Smith whose telephone number is (571) 272-9814. The examiner can normally be reached on 7:30 a.m. - 5:00 p.m., Mon - Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JRS

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